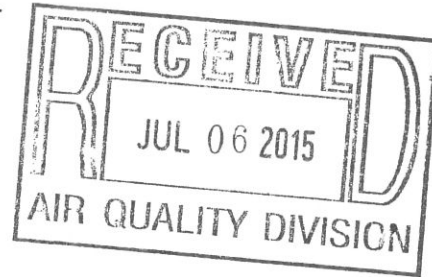


Reviewer Hmb
CC: _____
Modeler _____
D.E. _____
File QEPM-A0001250 QEP-A0001251
IMP FID 23808-QEP
26519-QEPM

TESORO
LOGISTICS
Tesoro Logistics GP, LLC
1050 17th Street, Suite 1700
Denver, CO 80265

July 2, 2015

Wyoming Department of Environmental Quality
Division of Air Quality
Herschler Building, 2E
122 West 25th Street
Cheyenne, Wyoming 82002



Subject: Mesa 8-17 Pad
Pinedale Field – Sublette County, Wyoming

Ladies/Gentlemen:

Tesoro Logistics – Rockies (TLLP), on behalf of QEPM Gathering I, LLC (QEPM), is submitting an application to modify/replace the dehydration unit equipment associated with the Mesa 8-17 Pad facility. The Mesa 8-17 dehydration equipment is owned by QEPM, but the production equipment is owned and operated by QEP Energy Company (QEPE). The Mesa 8-17 Pad is located in the SENE of Section 17, T32N, R109W in Sublette County, Wyoming.

An application was recently submitted to account for the split of the original QEPE permit into a permit for the QEPM dehydration equipment and the QEPE production equipment. This application is intended to obtain a modified permit to account for the replacement of the historic 40 MMSCFD dehydration unit with a 10 MMSCFD dehydration unit. In addition to the replacement of the dehydration unit, the line heater and associated heat trace pump have been removed.

The produced natural gas flows from all wells at this location through QEPE-owned production equipment and into a QEPM-owned dehydration unit separator and TEG dehydration unit. The emissions for the dehydration unit are controlled by a QEPM-owned BTEX combustor.

Based on the use of dehydration unit control and the federally enforceable limits provided by the Division's permitting process, the dehydration unit associated with this facility is a "synthetic minor" with respect to the National Emissions Standards for Hazardous Air Pollutants from Oil and Gas Natural Gas Production Facilities 40 CFR Part 63 Subpart HH. This unit is exempt from control requirements of 40 CFR 63.764(d) because the average emissions of benzene are less than 0.90 megagrams per year (40 CFR 63.764(e)(2)).

QEPE has implemented an infrared (IR) Leak Detection and Repair (LDAR) program as BACT for fugitive emission sources at the Mesa 8-17 Pad facility. QEPE has agreed to inspect QEPM equipment at this location with a FLIR camera as part of QEPE's ongoing LDAR program. As per WDEQ guidance, contributions from fugitive emission sources can be treated as insignificant at pads where an IR LDAR program has been implemented. Therefore, both historical and current fugitive emissions at the Mesa 8-17 Pad are deemed insignificant.

Under Attachment A of this submittal, the required WAQD IMPACT forms are included. Attachment B includes all supporting emissions calculations for the QEPM emissions at the Mesa 8-17 Pad.

To ensure offsets are not being double counted and credits are available for future permitting actions, the Division has requested that a spreadsheet be developed to track all permitting actions since April 1, 2008. This QEPM offset tracking spreadsheet has been recently created due to an equipment split at multiple facilities owned by QEPE with QEPM dehydration units on location. The offset tracking spreadsheet has been revised in this submittal to show both current QEPM emissions as well as QEPM's historical contribution of emissions at the Mesa 8-17 Pad. This spreadsheet is included under Attachment C.

If you should have any questions or need additional information in support of this submittal, please contact me at (303) 640-4238 or Lesair Environmental at (303) 904-2525.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Pring', with a stylized flourish at the end.

Daniel Pring
Senior Environmental Air Engineer

Enclosures

cc: Lesair Environmental

Company Name: QEPM Gathering I, LLC
Facility Name: Mesa 8-17

Attachment A

WAQD IMPACT Forms

Prepared for:
QEPM Gathering I, LLC

Prepared by:
Lesair Environmental, Inc.
www.Lesair.com



Department of Environmental Quality Air Quality Division

Permit Application Form

Is this a revision to an existing application?

Yes ☒

No ☐

Date of Application: 7/6/2015

Previous Application #:

Pending

COMPANY INFORMATION:

Company Name: QEPM Gathering I, LLC
Address: 1050 17th Street, Suite 1700
City: Denver State: CO Zip Code: 80265
Country: USA Phone Number: 303-640-4238

FACILITY INFORMATION:

Facility Name: Mesa 8-17
New Facility or Existing Facility: Existing
Facility Description: Multi-well production facility with one dehydration unit
Facility Class: Synthetic Minor Operating Status: In Service
Facility Type: Production Site

For Oil & Gas Production Sites ONLY:

First Date of Production (FDOP)/Date of Modification: 12/07/2001 / 05/07/2015
Does production at this facility contain H2S?* NO

**If yes, contact the Division.*

API Number(s):

49-035-22648, 25522, 25524, 25525,
25523, 25526, 25516, 25536, 25517, 25518, 25519, 25520, 25521, 25645, 25644

NAICS Code: 21111

FACILITY LOCATION:

**Enter the facility location in either the latitude/longitude area or section/township/range area. Both are not required.*

Physical Address: _____
City: _____ Zip Code: _____
State: _____ County: _____

OR

Latitude: 42.74889 Longitude: 109.85027
Quarter Quarter: SE Quarter: NE
Section: 17 Township: 32N Range: 109W

For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)

CONTACT INFORMATION:

**Note that an Environmental AND NSR Permitting Contact is required for your application to be deemed complete by the agency.*

Title: Mr. First Name: Daniel
Last Name: Pring
Company Name: QEPM Gathering I, LLC
Job Title: Senior Environmental Air Engineer
Address: 1050 17th Street, Suite 1700
City: Denver State: CO
Zip Code: 80265
Primary Phone No.: 303-640-4238 E-mail: Daniel.D.Pring@tsocorp.com
Mobile Phone No.: _____ Fax No.: _____
Contact Type: Compliance Start Date: Jun-15

Additional Contact Type (if needed):
Title: First Name: _____
Last Name: _____
Company Name: _____
Job Title: _____
Address: _____
City: _____ State:
Zip Code: _____
Primary Phone No.: _____ E-mail: _____
Mobile Phone No.: _____ Fax No.: _____
Contact Type: Start Date: _____

FACILITY APPLICATION INFORMATION:

General Info:

Has the facility changed location or is it a new/ greenfield facility?
Has a Land Use Planning document been included in this application?
Is the facility located in a sage grouse core area?*

No
 No
 No

NA

If the facility is in a sage grouse core area, what is the WER number?
* For questions about sage grouse core area, contact WY Game & Fish Department.

Federal Rules Applicability - Facility Level:

Prevention of Significant Deterioration (PSD):
Non-Attainment New Source Review:

No
 No

Modeling Section:

Has the Air Quality Division been contacted to determine if modeling is required?
Is a modeling analysis part of this application?

No
 No

Is the proposed project subject to Prevention of Significant Deterioration (PSD) requirements?
Has the Air Quality Division been notified to schedule a pre-application meeting?
Has a modeling protocol been submitted to and approved by the Air Quality Division?
Has the Air Quality Division received a Q/D analysis to submit to the respective FLMs to determine the need for an AQRV analysis?

No
 No
 No
 No

Required Attachments:

Facility Map ☐
Process Flow Diagram ☒
Modeling Analysis (if applicable) ☐
Land Use Planning Document ☐
Detailed Project Description ☒
Emissions Calculations ☒

I, Michael P. Gebhardt Vice President, Tesoro Logistics- Rockies
Responsible Official (Printed Name) Title

an Official Representative of the Company, state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further certify that the operational information provided and emission rates listed on this application reflect the anticipated emissions due to the operation of this facility. The facility will operate in compliance with all applicable Wyoming Air Quality Standards and Regulations.

Signature: _____
(ink)

Date: 7/3/15

Specific Emission Unit Attributes:**Dehydration Unit**

Company Equipment ID: _____

Company Equipment Description: (1) 10 MMSCFD TEG Dehydration UnitOperating Status: OperatingInitial Construction Commencement Date: 5/7/2015Initial Operation Commencement Date: 5/7/2015

Most Recent Construction/ Modification

Commencement Date: 5/7/2015Most Recent Operation Commencement Date: 5/7/2015**Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):**Reason: ModificationIf reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:Production equipment has been changed at this facility, therefore this source has been modifiedDehydration Type: TEG Design Capacity (MMscf/day): 10Temperature of Wet Gas (F): 79Water Content of Dry Gas (lbs H₂O/MMscf): 5Pressure of Wet Gas (psig): 479Manufacturer Name of Glycol Circulation Pump: KimrayModel Name and Number of Glycol Circulation Pump: (1) Kimray 9015 PVWater Content of Wet Gas (lbs H₂O/MMscf): 54.47Flow Rate of Dry Gas (MMscfd): 8.0Type of Glycol Circulation Pump: GasPump Volume Ratio (acfm/gpm): 0.08Actual LEAN Glycol Circulation Rate (gpm): 1.5Maximum LEAN Glycol Circulation Rate (gpm): 1.5Source of Motive Gas for Pump: Field GasInclude Glycol Flash Separator?: YesFlash Tank Off Gas Stream (scf/hr): 293Flash Tank Operating Temperature (F): 100Flash Tank Operating Pressure (psig): 35Where are Flash Vapors Routed?: CombustorIs Vessel Heated?: NoAdditional Gas Stripping?: NoStripping Gas Rate (scf/min): NASource of Stripping Gas: NA**SCC Codes:** List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).3-10-003-01**Potential Operating Schedule:**

Provide the operating schedule for this emission unit.

Hours/day: 24Hours/year: 8760

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed BACT: NA - JPAD/UGRB requires combustor at startup

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

HH

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:**Condenser**Manufacturer: Pesco Date Installed: 5/7/2015Model Name and Number: N/A Company Control Equipment ID: N/A

Company Control Equipment

Description: (1) 10 MMSCFD TEG Dehydration Unit Reboiler Still Vent Condenser

Pollutant(s) Controlled: ☐ CO ☐ NOx ☐ Pb ☐ SO2 ☒ VOC ☐ PM

☐ PM (FIL) ☐ PM Condensible ☐ PM 10 (FIL) ☐ PM 2.5 (FIL) ☐ PM 10 ☐ PM 2.5

☒ Other HAPS

Design Control Efficiency (%): _____ Capture Efficiency (%): 100

Operating Control Efficiency (%): _____

Condenser Type: Indirect ContactCoolant Type: Produced Gas

Design Coolant Temp. Range (F): _____

Design Coolant Flow Rate (gpm): _____

Max. Exhaust Gas Temp (F): 95 Inlet Gas Flow Rate (acfm): 13.45Outlet Gas Flow Rate (acfm): 0.159 Inlet Gas Temp (F): 212Operating Pressure (psia): 12 Outlet Gas Temp (F): 95☐ This is the only control equipment on this air contaminant sourceIf not, this control equipment is: ☐ Primary ☒ Secondary ☐ Parallel

List all other emission units that are also

vented to this control equipment: NoneList all release point IDs associated with this control equipment: N/A

Specific Emission Unit Attributes:

Flare

Company Equipment ID: _____
Company Equipment Description: BTEX Combustor

Operating Status: Operating
Initial Construction Commencement Date: 12/7/2001
Initial Operation Commencement Date: 12/7/2001
Most Recent Construction/ Modification
Commencement Date: 5/7/2015

Most Recent Operation Commencement Date: 5/7/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Modification

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Maximum Design Capacity (MMSCF/hr): _____
Minimum Design Capacity (MMSCF/hr): _____
Pilot Gas Volume (scf/min): 0.42
Emergency Flare Only: No Ignition Device Type: Pilot
Btu Content (Btu/scf): 1079.66 Smokeless Design: Yes
Assist Gas Utilized? No Continuously Monitored? Yes
Waste Gas Volume: 7206 Units: scf/day
Installation Date: 12/7/2001

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

3-10-001-60

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24
Hours/year: 8760

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR
61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: HH

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:

Flare/Combustor

Manufacturer: Cimarron Date Installed: 5/7/2015
Model Name and Number: BTEX Company Control Equipment ID: N/A
Description: BTEX Combustor associated with 10 MMSCFD TEG Dehydration Unit

Pollutant(s) Controlled: ☐ CO ☐ NOx ☐ Pb ☐ SO2 ☒ VOC ☐ PM
☐ PM (FIL) ☐ PM Condensable ☐ PM 10 (FIL) ☐ PM 2.5 (FIL) ☐ PM 10 ☐ PM 2.5
☒ Other HAPS

Design Control Efficiency (%): 98 Capture Efficiency (%): 100
Operating Control Efficiency (%): 98
Flare Type: Enclosed Elevated Flare Type: N/A
Ignition Device: Yes Flame Presence Sensor: Yes
Inlet Gas Temp (F): 95 Flame Presence Type: Thermocouple
Gas Flow Rate (acfm): 6.59 Outlet Gas Temp (F):

☒ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☒ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment: 10 MMSCFD TEG Dehydration Unit w/ Condenser and Flash Tank

List all release point IDs associated with this control equipment:

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: _____

Company Equipment Description: (1) 0.125 MMBtu/hr TEG Reboiler

Operating Status: Operating

Initial Construction Commencement Date: 5/7/2015

Initial Operation Commencement Date: 5/7/2015

Most Recent Construction/ Modification

Commencement Date: 5/7/2015

Most Recent Operation Commencement

Date: 5/7/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Modification

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

New wells and production equipment have been added to this facility, therefore this source has been modified

Firing Type: Direct

Heat Input Rating: 0.125

Units: MMBtu/hr

Primary Fuel Type: Field Gas

Secondary Fuel Type: N/A

Heat Content of Fuel: 1080

Units: BTU/scf

Fuel Sulfur Content: N/A

Units: _____

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

3-10-002-27

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40
CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Pneumatic Equipment (Pumps and Controllers)

Company Equipment ID: _____

Company Equipment Description: _____

(4) Cemco/Wellmark Mizer Low-Bleed Pneumatic Liquid Level Controller(s)

Operating Status: Operating

Initial Construction Commencement Date: 5/7/2015

Initial Operation Commencement Date: 5/7/2015

Most Recent Construction/ Modification

Commencement Date: 5/7/2015

Most Recent Operation Commencement

Date: 5/7/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Modification

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

New wells and production equipment have been added to this facility, therefore this source has been modified

Type of Equipment: Controller

Motive Force: Field Gas

VOC Content (%): 6.30%

HAP Content (%): 0.25%

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

3-10-002-99

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61.
(These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Separator/Treater

Company Equipment ID: _____

Company Equipment Description: (1) Dehy Unit Separator

Operating Status: Operating

Initial Construction Commencement Date: 5/7/2015

Initial Operation Commencement Date: 5/7/2015

Most Recent Construction/ Modification

Commencement Date: 5/7/2015

Most Recent Operation Commencement

Date: 5/7/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Modification

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

New wells and production equipment have been added to this facility, therefore this source has been modified

Type of Vessel: 3-Phase Separator

Is Vessel Heated?

No

Operating Temperature (F): 79

Operating Pressure (psig): 479

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

3-10-001-07

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR
61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Storage Tank/Silo

Company Equipment ID: _____

Company Equipment Description: (1) 300 bbl Test Tank

Operating Status: Operating

Initial Construction Commencement Date: 12/7/2001

Initial Operation Commencement Date: 12/7/2001

Most Recent Construction/ Modification

Commencement Date: 5/7/2015

Most Recent Operation Commencement

Date: 5/7/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Modification

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Production equipment has been changed, therefore this source has been modified

Material Type: Liquid

Description of Material Stored: oil/produced water only during periods of well testing

Capacity: 300 Units: barrels

Maximum Throughput: NA Units:

Maximum Hourly Throughput: NA Units:

Is Tank Heated?: Yes

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

3-10-002-99

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: intermittent

Hours/year: intermittent

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR
61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Fugitives

Company Equipment ID: Facility-Wide Fugitive Emissions
Company Equipment Description: [(1) Dehy Separator, (1) Test Tank, (1) Dehy w/ Combustor]

Operating Status: Operating
Initial Construction Commencement Date: 12/7/2001
Initial Operation Commencement Date: 12/7/2001
Most Recent Construction/ Modification
Commencement Date: 5/7/2015
Most Recent Operation Commencement
Date: 5/7/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Equipment replaced

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Production equipment has been changed, therefore this source has been modified

Type of Fugitive Emission: Fugitive Leaks at O&G

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

3-10-002-07, 3-10-002-23, 3-10-002-24, 3-10-002-26

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24
Hours/year: 8760

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☒ Yes ☐ No

Pollutant: _____

Proposed BACT: Facility-wide LDAR using FLIR Infrared Camera (as per QEPE LDAR Protocol)

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☒ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standards are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These
include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Company Name: QEPM Gathering I, LLC
Facility Name: Mesa 8-17

Attachment B

Supporting Emissions Calculations

Process Description

This is the process description associated with the dehydration equipment (owned by QEPM Gathering I, LLC) which is co-located with Mesa 8-17 well pad facility (owned by QEP Energy Company). This existing equipment was previously carried within the applicable QEP Energy permit but to clarify ownership is being separated out into its own permit.

QEP Energy (QEPE) equipment separates and processes the production from all of the producing natural gas wells associated with this pad facility. The well production leaves the applicable QEPE equipment, is commingled into a single process stream and routed to a QEPM Gathering I, LLC (QEPM) high-pressure separator (known as the dehydration unit separator).

In the dehydration unit separator, the fluids are separated into individual components (natural gas, produced water, hydrocarbon liquid). The hydrocarbon liquid (condensate) and produced water flow directly into their respective pipelines where they are sent to a Central Gathering Facility for further processing. The natural gas phase exits the dehydration unit separator and is sent to a tri-ethylene glycol (TEG) dehydration unit.

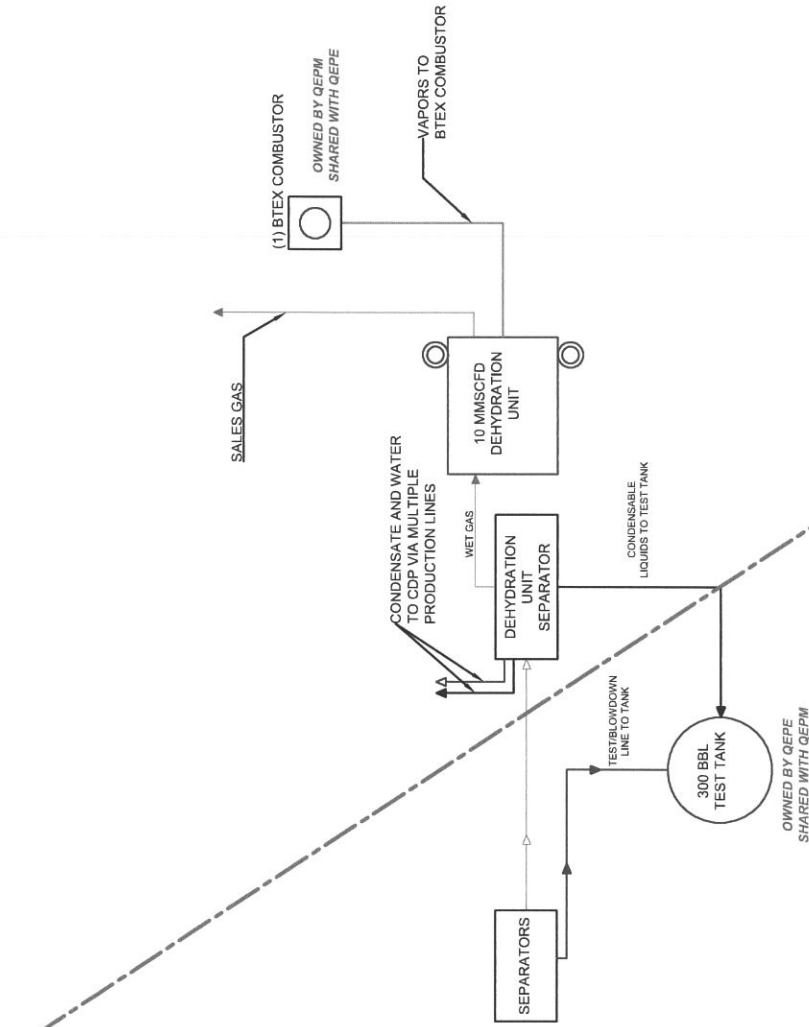
A 10 MMSCFD TEG dehydration unit (equipped with a 9015 PV Kimray glycol circulation pump, reboiler condenser and BTEX combustor) dehydrates the gas to meet a certain pipeline specification. Here the gas stream bubbles up through tri-ethylene glycol (TEG) in a process vessel known as a contactor. During this process water vapor is removed from the gas to meet a concentration determined by a sales contract. The pipeline quality natural gas exits the contactor, is measured, and then enters the gas gathering pipeline system.

The TEG is regenerated using heat in a vessel known as the glycol reboiler. The TEG is heated to a set temperature that boils the impurities out of the TEG, sending the vapors through a condenser to (1) one BTEX combustor where they are burned. (The BTEX combustor is owned by QEPM but is a shared control device also used by some of the QEPE processes onsite). The regenerated TEG is then circulated back through the contactor.

The liquids from the condenser are recovered in a blowcase pot. Pressurized gas is used to force all these recovered condensable liquids out of the blowcase pot to a 300 bbl. test tank (owned by QEPE but shared by QEPM). This is a closed system and any residual gas used in this process is routed to the BTEX combustor.

Fugitive emissions associated with the piping connections, flanges, valves, etc. occur due to the potential seeping of vapor from connections, seats, and seals.

Pneumatic controllers, operated using natural gas, are used to actuate level control valves on the separators.



QEPM OWNERSHIP
(1) DEHYDRATION UNIT SEPARATOR
(1) 10 MMSCFD TEG DEHYDRATION UNIT
(1) BTEx COMBUSTOR

QEPM OWNERSHIP
(1) 300 BBL TEST TANK
SEPARATORS

Process Flow Diagram
NOT TO SCALE

QEPM Gathering I, LLC		Date: 11/24/2014
Well Site: Mesa 8-17	Drawn By: Lisa Armoto	
Sec. 17, T32N, R109W	Revision Date: 06/24/2015	
Latitude: 42.74889°	Revised By: Lisa Armoto	
Longitude: 109.85027°	Approved By: Ty Smith	

This drawing is a general representation based on the equipment of the Mesa 8-17 Pad. The actual orientation of equipment at this Pad may be different.

TEST TANK	PIPING	WELLHEAD	BTEx COMBUSTOR
DEHYDRATION UNIT	SEPARATOR		

Company Name: QEPM Gathering I, LLC
Field Name: Pinedale Field
Facility Name: Mesa 8-17

Wyoming Air Quality Application Emission Summary Sheet

Uncontrolled Production Equipment Emissions

Ref No.	Equipment	Note	NOx		CO		SO2		Particulates		VOC		Total HAPs	
			lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
001	(1) 10 MMSCFD TEG Dehydration Unit	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.90	21.48	3.61	15.80
002	(1) Flash Tank Separator(s)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	8.15	0.16	0.70
003	(1) 0.125 MMBtu/hr TEG Reboiler	c	0.01	0.06	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
004	Fugitives	d	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	1.43	0.01	0.05
005	Pneumatic Controllers	e	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
006	(1) 300 bbl Test Tank	f	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	insig.	insig.	insig.	insig.
	Total		0.01	0.06	0.01	0.05	0.00	0.00	0.00	0.00	7.09	31.07	3.78	16.55

NOTES: a - Reboiler still column vent emissions calculated using GRI-GLYCalc 4.0 software, a Mesa 8-17 Pad Wet Gas Analysis, the maximum glycol circulation rate and the current average estimated natural gas production rate.
b - TEG flash tank vapors are sent to BTEX combustor, however as a worst case scenario 100% of TEG flash tank vapors are being vented to atmosphere.
c - Burner emissions based on EPA AP-42 emission factors from Section 1.4, Tables 1.4-1 and 1.4-2 for uncontrolled natural gas burners (July 1998), the worst case assumption that burners operate 8,760 hours per year and a fuel heating value of 1079.7 Btu/SCF.
d - Fugitive emissions account for VOC/HAP vapors from connections, valves, tank hatches and relief vent/valves. Emission factors derived from table 2-4, PA-453/R-95-017
e - Pneumatic Controller VOC/HAP emissions based on VOC/HAP fraction of the instrument gas; consumption rates taken from manufacturer literature for specific sources.
f - Based on previous Promax and EPA Tanks process simulations as well as stack emission tests performed by QEP Energy, required by the WAQD, test tank emissions are considered insignificant.

Company Name: QEPM Gathering I, LLC
Field Name: Pinedale Field
Facility Name: Mesa 8-17

Wyoming Air Quality Application Emission Summary Sheet

Controlled Production Equipment Emissions

Ref No.	Equipment	Note	NOx		CO		SO ₂		Particulates		VOC		Total HAP's	
			lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
001	(1) 10 MMSCFD TEG Dehydration Unit	a	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.01
002	(1) Flash Tank Separator(s)	b	0.05	0.20	0.01	0.05	0.00	0.00	0.00	0.00	0.04	0.16	0.00	0.01
003	(1) 0.125 MMbtu/hr TEG Reboiler	c	0.01	0.06	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
004	Fugitives	d	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	insig.	insig.	insig.	insig.
005	Pneumatic Controllers	e	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
006	(1) 300 bbl Test Tank	f	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	insig.	insig.	insig.	insig.
007	(1) BTEX Combustor	g	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Total			0.06	0.28	0.02	0.10	0.00	0.00	0.00	0.00	0.05	0.22	0.01	0.03

NOTES: a - Reboiler still column vent emissions are based on a 98% VOC/HAP destruction efficiency for dehydration unit vapors and WAQD flare emission factors for other criteria pollutants.

b - Flash tank emissions are based on 98% destruction efficiency for flash tank vapors.

c - Burner emissions based on EPA AP-42 emission factors from Section 1.4, Tables 1.4-1 and 1.4-2 for uncontrolled natural gas burners (July 1998), the worst case assumption that burners operate 8,760 hours per year and a fuel heating value of 1079.7 Btu/SCF.

d - Due to implementation of infrared LDAR program, both baseline and current fugitive emissions are being treated as insignificant (as approved by the WAQD)

e - Pneumatic Controller VOC/HAP emissions based on VOC/HAP fraction of the instrument gas; consumption rates taken from manufacturer literature for specific sources.

f - Based on previous Promax and EPA Tanks process simulations as well as stack emission tests performed by QEP Energy, required by the WAQD, test tank emissions are considered insignificant.

g - Combustor emissions are for combustor pilots only, other emissions are accounted for at controlled emissions source. Emissions are based on WAQD flare emission factors for criteria pollutants

Company Name: QEPM Gathering I, LLC
 Field Name: Pinedale Field
 Facility Name: Mesa 8-17

Dehydrator Still Column Vent Emission Calculations

GRI GLYCalc 4.0 Method

UNCONTROLLED EMISSIONS (As Per WAQD Methodology)

Annual Rate: 8.0 MMSCFD For the 10 MMSCFD Unit
 Glycol Pump Type: (1) Kimray 9015 PV
 Pump Rate(s): 1.5 gpm

Reference No.	Individual HAP Component Emissions												
		Benzene		Toluene		Ethyl-Benzene		Xylene		n-Hexane		2,2,4-Trimethylpentane	
		(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)
001	Reboiler	1.11	4.88	1.95	8.54	0.00	0.00	0.49	2.15	0.05	0.21	0.01	0.02
002	Flash Tank	0.04	0.19	0.04	0.19	0.00	0.00	0.00	0.02	0.06	0.28	0.01	0.03
	Total	1.16	5.07	1.99	8.73	0.00	0.00	0.49	2.17	0.11	0.49	0.01	0.05

Reference No.		Aggregated Emissions			
		Total HAP		VOC	
		(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)
001	Reboiler	3.61	15.80	4.90	21.48
002	Flash Tank	0.16	0.70	1.86	8.15
	Total	3.77	16.50	6.76	29.63

CONTROLLED EMISSIONS

Annual Rate: 8.0 MMSCFD For the 10 MMSCFD Unit
 Glycol Pump Type: (1) Kimray 9015 PV
 Pump Rate(s): 1.5 gpm

Reference No.	Individual HAP Component Emissions												
		Benzene		Toluene		Ethyl-Benzene		Xylene		n-Hexane		2,2,4-Trimethylpentane	
		(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)
001	Reboiler	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
002	Flash Tank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	Total	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00

Reference No.		Aggregated Emissions			
		Total HAP		VOC	
		(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)
001	Reboiler	0.00	0.01	0.01	0.03
002	Flash Tank	0.00	0.01	0.04	0.16
	Total	0.01	0.03	0.04	0.20

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Mesa 8-17 Pad (2015 App)

File Name: L:\Datafile\GlyCalc 4.0 Data Files\QEPM\Wyoming\Mesa 8-17 Pad (2015 App)
lta.ddf

Date: June 30, 2015

DESCRIPTION:

Description: QEPM Gathering I, LLC- Pinedale
 Mesa 8-17 Pad Wet Gas Analysis
 Press/Temp/Dew Pt= 479/79/5.0 lbs/MMSCF
 (1) Kimray 9015 PV Pumps @ 1.5gpm
 Annual Rate of 8 MMSCFD

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 79.00 deg. F
 Pressure: 479.00 psig
 Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.4798
Nitrogen	0.1206
Methane	92.8579
Ethane	4.5262
Propane	1.1036
Isobutane	0.2888
n-Butane	0.2591
Isopentane	0.1192
n-Pentane	0.0722
n-Hexane	0.0276
Cyclohexane	0.0160
Other Hexanes	0.0543
Heptanes	0.0291
Methylcyclohexane	0.0184
2,2,4-Trimethylpentane	0.0022
Benzene	0.0097
Toluene	0.0093
Xylenes	0.0011
C8+ Heavies	0.0049

DRY GAS:

Flow Rate: 8.0 MMSCF/day
 Water Content: 5.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
 Water Content: 1.5 wt% H2O
 Flow Rate: 1.5 gpm

PUMP:

Glycol Pump Type: Gas Injection
Gas Injection Pump Volume Ratio: 0.080 acfm gas/gpm glycol

FLASH TANK:

Flash Control: Combustion device
Flash Control Efficiency: 98.00 %
Temperature: 100.0 deg. F
Pressure: 35.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Condenser
Temperature: 95.0 deg. F
Pressure: 12.0 psia

Control Device: Combustion Device
Destruction Efficiency: 98.0 %
Excess Oxygen: 5.0 %
Ambient Air Temperature: 50.0 deg. F

GRI-GLYCalc VERSION 4.0 - EMISSIONS SUMMARY

Case Name: Mesa 8-17 Pad (2015 App)

File Name: L:\Datafile\GlyCalc 4.0 Data Files\QEPM\Wyoming\Mesa 8-17 Pad (2015 App)
lta.ddf

Date: June 30, 2015

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0027	0.066	0.0120
Ethane	0.0012	0.030	0.0054
Propane	0.0011	0.027	0.0049
Isobutane	0.0006	0.016	0.0028
n-Butane	0.0008	0.019	0.0034
Isopentane	0.0003	0.008	0.0014
n-Pentane	0.0003	0.008	0.0014
n-Hexane	0.0001	0.004	0.0007
Cyclohexane	0.0004	0.010	0.0018
Other Hexanes	0.0003	0.006	0.0011
Heptanes	0.0002	0.005	0.0008
Methylcyclohexane	0.0004	0.009	0.0016
2,2,4-Trimethylpentane	<0.0001	<0.001	<0.0001
Benzene	0.0019	0.046	0.0084
Toluene	0.0012	0.028	0.0051
Xylenes	0.0001	0.002	0.0003
C8+ Heavies	<0.0001	<0.001	<0.0001
Total Emissions	0.0117	0.281	0.0513
Total Hydrocarbon Emissions	0.0117	0.281	0.0513
Total VOC Emissions	0.0077	0.185	0.0338
Total HAP Emissions	0.0033	0.079	0.0145
Total BTEX Emissions	0.0032	0.076	0.0138

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.1383	3.319	0.6057
Ethane	0.0640	1.536	0.2804
Propane	0.0672	1.613	0.2943
Isobutane	0.0458	1.099	0.2005
n-Butane	0.0647	1.552	0.2833
Isopentane	0.0468	1.123	0.2049
n-Pentane	0.0415	0.995	0.1816
n-Hexane	0.0490	1.175	0.2145
Cyclohexane	0.1867	4.480	0.8177
Other Hexanes	0.0621	1.490	0.2719
Heptanes	0.1701	4.083	0.7451
Methylcyclohexane	0.3313	7.952	1.4512
2,2,4-Trimethylpentane	0.0050	0.120	0.0219
Benzene	1.1141	26.738	4.8797
Toluene	1.9487	46.770	8.5355
Xylenes	0.4907	11.776	2.1492
C8+ Heavies	0.2801	6.723	1.2269
Total Emissions	5.1060	122.543	22.3641

Page: 2			
Total Hydrocarbon Emissions	5.1060	122.543	22.3641
Total VOC Emissions	4.9037	117.688	21.4781
Total HAP Emissions	3.6075	86.579	15.8007
Total BTEX Emissions	3.5535	85.284	15.5643

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.2204	5.289	0.9652
Ethane	0.0261	0.626	0.1142
Propane	0.0117	0.281	0.0513
Isobutane	0.0049	0.117	0.0214
n-Butane	0.0051	0.122	0.0223
Isopentane	0.0030	0.073	0.0133
n-Pentane	0.0021	0.051	0.0092
n-Hexane	0.0013	0.030	0.0055
Cyclohexane	0.0012	0.029	0.0053
Other Hexanes	0.0022	0.052	0.0095
Heptanes	0.0020	0.047	0.0086
Methylcyclohexane	0.0016	0.037	0.0068
2,2,4-Trimethylpentane	0.0001	0.003	0.0005
Benzene	0.0009	0.021	0.0038
Toluene	0.0009	0.021	0.0039
Xylenes	0.0001	0.002	0.0003
C8+ Heavies	0.0003	0.007	0.0013
Total Emissions	0.2836	6.808	1.2424
Total Hydrocarbon Emissions	0.2836	6.808	1.2424
Total VOC Emissions	0.0372	0.893	0.1629
Total HAP Emissions	0.0032	0.077	0.0140
Total BTEX Emissions	0.0018	0.044	0.0080

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.0188	264.450	48.2621
Ethane	1.3036	31.286	5.7098
Propane	0.5854	14.049	2.5639
Isobutane	0.2443	5.864	1.0701
n-Butane	0.2543	6.102	1.1137
Isopentane	0.1516	3.638	0.6640
n-Pentane	0.1054	2.529	0.4615
n-Hexane	0.0630	1.513	0.2761
Cyclohexane	0.0601	1.442	0.2631
Other Hexanes	0.1088	2.611	0.4765
Heptanes	0.0979	2.349	0.4287
Methylcyclohexane	0.0778	1.867	0.3407
2,2,4-Trimethylpentane	0.0060	0.144	0.0262
Benzene	0.0429	1.031	0.1881
Toluene	0.0443	1.064	0.1942
Xylenes	0.0040	0.096	0.0175
C8+ Heavies	0.0144	0.345	0.0630
Total Emissions	14.1825	340.379	62.1191
Total Hydrocarbon Emissions	14.1825	340.379	62.1191
Total VOC Emissions	1.8601	44.642	8.1472

Total HAP Emissions	0.1603	3.847	Page: 3 0.7021
Total BTEX Emissions	0.0913	2.190	0.3997

GRI-GLYCalc VERSION 4.0

Case Name: Mesa 8-17 Pad (2015 App)

File Name: L:\Datafile\GlyCalc 4.0 Data Files\QEPM\Wyoming\Mesa 8-17 Pad (2015 App)
lta.ddf

Date: June 30, 2015

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
 Calculated Dry Gas Dew Point: 2.76 lbs. H2O/MMSCF
 Temperature: 79.0 deg. F
 Pressure: 479.0 psig
 Dry Gas Flow Rate: 8.0000 MMSCF/day
 Glycol Losses with Dry Gas: 0.0164 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 54.47 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 5.22 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.05%	94.95%
Carbon Dioxide	99.83%	0.17%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.96%	0.04%
Propane	99.92%	0.08%
Isobutane	99.88%	0.12%
n-Butane	99.83%	0.17%
Isopentane	99.81%	0.19%
n-Pentane	99.75%	0.25%
n-Hexane	99.54%	0.46%
Cyclohexane	97.99%	2.01%
Other Hexanes	99.66%	0.34%
Heptanes	99.03%	0.97%
Methylcyclohexane	97.50%	2.50%
2,2,4-Trimethylpentane	99.58%	0.42%
Benzene	82.70%	17.30%
Toluene	73.60%	26.40%
Xylenes	51.86%	48.14%
C8+ Heavies	96.06%	3.94%

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Mesa 8-17 Pad (2015 App)

File Name: L:\Datafile\GlyCalc 4.0 Data Files\QEPM\Wyoming\Mesa 8-17 Pad (2015 App)
lta.ddf

Date: June 30, 2015

CONDENSER VENT STREAM

Temperature: 95.00 deg. F
 Pressure: 12.00 psia
 Flow Rate: 7.25e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	6.88e+000	2.37e-002
Carbon Dioxide	8.18e+000	6.88e-002
Nitrogen	5.62e-002	3.01e-004
Methane	4.48e+001	1.37e-001
Ethane	1.07e+001	6.17e-002
Propane	6.68e+000	5.63e-002
Isobutane	2.91e+000	3.23e-002
n-Butane	3.54e+000	3.93e-002
Isopentane	1.17e+000	1.61e-002
n-Pentane	1.17e+000	1.62e-002
n-Hexane	4.55e-001	7.49e-003
Cyclohexane	1.26e+000	2.02e-002
Other Hexanes	7.93e-001	1.31e-002
Heptanes	4.93e-001	9.45e-003
Methylcyclohexane	9.45e-001	1.77e-002
2,2,4-Trimethylpentane	1.28e-002	2.79e-004
Benzene	6.45e+000	9.63e-002
Toluene	3.30e+000	5.81e-002
Xylenes	1.65e-001	3.34e-003
C8+ Heavies	1.40e-003	4.54e-005
-----	-----	-----
Total Components	100.00	6.78e-001

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Mesa 8-17 Pad (2015 App)

File Name: L:\Datafile\GlyCalc 4.0 Data Files\QEPM\Wyoming\Mesa 8-17 Pad (2015 App)
lta.ddf

Date: June 30, 2015

REGENERATOR OVERHEADS STREAM

 Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 3.89e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	9.34e+001	1.73e+001
Carbon Dioxide	1.58e-001	7.15e-002
Nitrogen	1.06e-003	3.05e-004
Methane	8.41e-001	1.38e-001
Ethane	2.08e-001	6.40e-002
Propane	1.49e-001	6.72e-002
Isobutane	7.68e-002	4.58e-002
n-Butane	1.09e-001	6.47e-002
Isopentane	6.32e-002	4.68e-002
n-Pentane	5.61e-002	4.15e-002
n-Hexane	5.54e-002	4.90e-002
Cyclohexane	2.16e-001	1.87e-001
Other Hexanes	7.02e-002	6.21e-002
Heptanes	1.66e-001	1.70e-001
Methylcyclohexane	3.29e-001	3.31e-001
2,2,4-Trimethylpentane	4.26e-003	4.99e-003
Benzene	1.39e+000	1.11e+000
Toluene	2.06e+000	1.95e+000
Xylenes	4.51e-001	4.91e-001
C8+ Heavies	1.60e-001	2.80e-001
-----	-----	-----
Total Components	100.00	2.24e+001

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Mesa 8-17 Pad (2015 App)

File Name: L:\Datafile\GlyCalc 4.0 Data Files\QEPM\Wyoming\Mesa 8-17 Pad (2015 App)
lta.ddf

Date: June 30, 2015

FLASH TANK OFF GAS STREAM

 Temperature: 100.00 deg. F
 Pressure: 49.70 psia
 Flow Rate: 2.93e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	1.52e-001	2.11e-002
Carbon Dioxide	1.14e+000	3.88e-001
Nitrogen	1.16e-001	2.52e-002
Methane	8.90e+001	1.10e+001
Ethane	5.61e+000	1.30e+000
Propane	1.72e+000	5.85e-001
Isobutane	5.44e-001	2.44e-001
n-Butane	5.66e-001	2.54e-001
Isopentane	2.72e-001	1.52e-001
n-Pentane	1.89e-001	1.05e-001
n-Hexane	9.47e-002	6.30e-002
Cyclohexane	9.24e-002	6.01e-002
Other Hexanes	1.63e-001	1.09e-001
Heptanes	1.26e-001	9.79e-002
Methylcyclohexane	1.03e-001	7.78e-002
2,2,4-Trimethylpentane	6.79e-003	5.99e-003
Benzene	7.12e-002	4.29e-002
Toluene	6.23e-002	4.43e-002
Xylenes	4.87e-003	3.99e-003
C8+ Heavies	1.09e-002	1.44e-002
-----	-----	-----
Total Components	100.00	1.46e+001

QUESTAR APPLIED TECHNOLOGY

1210 D. Street, Rock Springs, Wyoming 82901

(307) 352-7292

LIMS ID:	N/A	Description:	Mesa 8-17 Pad
Analysis Date/Time:	6/13/2014 11:40 AM	Field:	Pinedale
Analyst Initials:	PRP	ML#:	QEP
Instrument ID:	Instrument 1	GC Method:	Quesbtex
Data File:	QPC68.D		
Date Sampled:	6/12/2014		

Component	Mol%	Wt%	LV%
Methane	92.8579	84.6256	89.0817
Ethane	4.5262	7.7315	6.8696
Propane	1.1036	2.7645	1.7221
Isobutane	0.2888	0.9537	0.5351
n-Butane	0.2591	0.8554	0.4626
Neopentane	0.0115	0.0470	0.0249
Isopentane	0.1077	0.4415	0.2233
n-Pentane	0.0722	0.2960	0.1481
2,2-Dimethylbutane	0.0044	0.0215	0.0104
2,3-Dimethylbutane	0.0094	0.0462	0.0219
2-Methylpentane	0.0252	0.1235	0.0593
3-Methylpentane	0.0153	0.0749	0.0354
n-Hexane	0.0276	0.1350	0.0642
Heptanes	0.0847	0.4521	0.1866
Octanes	0.0040	0.0260	0.0112
Nonanes	0.0014	0.0092	0.0035
Decanes plus	0.0006	0.0049	0.0021
Nitrogen	0.1206	0.1920	0.0749
Carbon Dioxide	0.4798	1.1995	0.4631
Oxygen	0.0000	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000	0.0000
Total	100.0000	100.0000	100.0000
Global Properties	Units		
Gross BTU/Real CF	1084.8	BTU/SCF at 60°F and 14.73 psia	
Sat. Gross BTU/Real CF	1067.1	BTU/SCF at 60°F and 14.73 psia	
Gas Compressibility (Z)	0.9976		
Specific Gravity	0.6093	air=1	
Avg Molecular Weight	17.603	gm/mole	
Propane GPM	0.302456	gal/MCF	
Butane GPM	0.175741	gal/MCF	
Gasoline GPM	0.134692	gal/MCF	
26# Gasoline GPM	0.216167	gal/MCF	
Total GPM	1.918933	gal/MCF	
Base Mol%	99.485	%v/v	
Sample Temperature:	79	°F	
Sample Pressure:	479	psig	
H2S Length of Stain Tube	N/A	ppm	

Component	Mol%	Wt%	LV%
Benzene	0.0097	0.0433	0.0154
Toluene	0.0093	0.0489	0.0177
Ethylbenzene	0.0000	0.0000	0.0000
M&P Xylene	0.0011	0.0067	0.0024
O-Xylene	0.0000	0.0000	0.0000
2,2,4-Trimethylpentane	0.0022	0.0144	0.0063
Cyclopentane	0.0000	0.0000	0.0000
Cyclohexane	0.0160	0.0767	0.0309
Methylcyclohexane	0.0184	0.1028	0.0420
Description:	Mesa 8-17 Pad		

GRI GlyCalc Information

Component	Mol%	Wt%	LV%
Carbon Dioxide	0.4798	1.1995	0.4631
Hydrogen Sulfide	0.0000	0.0000	0.0000
Nitrogen	0.1206	0.1920	0.0749
Methane	92.8579	84.6256	89.0817
Ethane	4.5262	7.7315	6.8696
Propane	1.1036	2.7645	1.7221
Isobutane	0.2888	0.9537	0.5351
n-Butane	0.2591	0.8554	0.4626
Isopentane	0.1192	0.4885	0.2482
n-Pentane	0.0722	0.2960	0.1481
Cyclopentane	0.0000	0.0000	0.0000
n-Hexane	0.0276	0.1350	0.0642
Cyclohexane	0.0160	0.0767	0.0309
Other Hexanes	0.0543	0.2661	0.1270
Heptanes	0.0291	0.1660	0.0743
Methylcyclohexane	0.0184	0.1028	0.0420
2,2,4 Trimethylpentane	0.0022	0.0144	0.0063
Benzene	0.0097	0.0433	0.0154
Toluene	0.0093	0.0489	0.0177
Ethylbenzene	0.0000	0.0000	0.0000
Xylenes	0.0011	0.0067	0.0024
C8+ Heavies	0.0049	0.0334	0.0144
Subtotal	100.0000	100.0000	100.0000
Oxygen	0.0000	0.0000	0.0000
Total	100.0000	100.0000	100.0000

Company Name:
Field Name:
Facility Name:

QEPM Gathering I, LLC
Pinedale Field
Mesa 8-17

Wyoming Air Quality Standards and Regulations

Enclosed Flare Emission Analysis Worksheet

(Based on Office of Air Quality Planning and Standards, EPA, AP-42 Manual, Fifth Edition, January 1995, Section 13.5)

Source with vapors sent to the Combustion Chamber	Vapor Volume (SCFD)	Vapor Heating Value (Btu/scf)	H2S Content (%)	NOx (lb/hr)	NOx (TPY)	CO (lb/hr)	CO (TPY)	SO2 (lb/hr)	SO2 (TPY)	VOC (lb/hr)	VOC (TPY)	HAPs (lb/hr)	HAPs (TPY)
10MMSCFD Dehydration Unit 1	174	1841	0	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.01
Flash Tank Separator	7032	1102	0	0.05	0.20	0.01	0.05	0.00	0.00	0.04	0.16	0.00	0.01
Pilot Gas	600	1080	0	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Total	7806		0	0.05	0.22	0.01	0.06	0.00	0.00	0.05	0.20	0.01	0.03

NOTES: 1 - Enclosed flare NOx and CO emissions based on continuous operation, using emission factors requested by WDEQ in O&G Production Facilities C6S2 Guidance, Appendix B13.

2 - Enclosed flare VOC emissions based on 98% destruction efficiency of the control equipment.

10 MMSCFD Dehy	
Flash Vent Gas (SCF/hr)	293
Flash Vent Gas (SCFD)	7032

10 MMSCFD Dehy	
Condenser Vent Gas (SCF/hr)	7
Condenser Vent Gas (SCFD)	174

Pilot Gas (SCF/hr)	Pilot Gas (hrs/day)	Pilot Gas (SCFD)
25	24	600

Company Name: QEPM Gathering I, LLC
 Field Name: Pinedale Field
 Facility Name: Mesa 8-17

Emission Calculation for External Combustion Sources

AP-42 Calculation Method

(For Estimating Emissions, Using Emission Factors from EPA AP-42, Table 1.4-1 and Table 1.4-2)

Burner Data

Reference No.	Burner Rating (MMBtu/Hr)	Count	Equipment	Annual Op Time (hours)	Fuel Type	Fuel Htg Value (Btu/scf)	Fraction of VOC ¹
003	0.125	1	TEG Reboiler(s)	8759	Field	1080	0.06

1 - Fraction of VOC is derived from the fuel gas analysis (MW_{VOC}/MW_{TOTAL})

Reference No.	Consumption Rating (Ft3/Hr)	Count	Equipment	Annual Op Time (hours)	Fuel Type	Fuel Htg Value (Btu/scf)	VOC Fraction ¹

1 - Fraction of VOC is derived from the fuel gas analysis (MW_{VOC}/MW_{TOTAL})

Emission Factors

Reference No.	Burner Rating (MMBtu/Hr)	Emission Factors					
		NOx (Lb/MMFt ³)	CO (Lb/MMFt ³)	SO ₂ (Lb/MMFt ³)	PM (Lb/MMFt ³)	TOC ² (Lb/MMFt ³)	VOC ³ (Lb/MMFt ³)
003	0.125	100.0	84.0	0.6	7.6	11.0	0.7
EF Source		AP-42	AP-42	AP-42	AP-42	AP-42	Estimate

2- Total Organic Compounds (TOC)

3 - VOC emission factor determined by taking TOC factor times fraction of fuel gas that was VOC (as per C6S2 guidance, Mar 10).

Reference No.	Consumption Rating (Ft3/Hr)	Emission Factors					
		NOx (Lb/MMFt ³)	CO (Lb/MMFt ³)	SO ₂ (Lb/MMFt ³)	PM (Lb/MMFt ³)	TOC (Lb/MMFt ³)	VOC (Lb/MMFt ³)
EF Source		AP-42	AP-42	AP-42	AP-42	AP-42	Estimate

Emissions (Lb/Hr) = E.F. (Lb/MMFt³) * FHV/1020 * Burner Rating (MMBtu/Hr) * 1/1020 * 1 MMFt³/1x10⁶ ft³ * 1x10⁶ Btu/MMBtu

Emissions (TPY) = Emissions (Lb/Hr) * Annual Operating Time (Hr/Yr) * 1 ton/2,000 Lb

Source Emissions

Reference No.	Source Emissions									
	NOx		CO		SO ₂		PM		VOC	
	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)	(Lb/Hr)	(TPY)
003	0.01	0.06	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.01	0.06	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.00

* Thermo Electric Generator Emissions (Lb/Hr) = E.F. (Lb/MMFt³) * Consumption Rate (ft³/Hr) * 1 MMFt³/1x10⁶ ft³

Company Name: **QEPM Gathering I, LLC**
 Field Name: **Pinedale Field**
 Facility Name: **Mesa 8-17**

Pneumatic Controller Equipment Emission Calculations

Current Controller Emissions (Uncontrolled)

Pneumatic Controller Emissions = (# of Controllers) * (Consumption Rate [scf/hr]) * (lb-mole/379.41 scf) * motive gas molecular weight (lb/lb-mole) * wt% VOC.

Component Description	Quantity	Manufacturer	Model	Consumption Rate (scfh)	Hours of Operation	VOC wt. fraction of instrument gas	HAP wt. fraction of instrument gas	VOC Emission (lb/hr)	VOC Emission (TPY)	HAP Emission (lb/hr)	HAP Emission (TPY)
Liquid Level Controller(s)	4	Cemco/Wellmark	Mizer (low-bleed)	0.275	8760	0.06	0.0025	0.00	0.01	0.00	0.00
								0.00	0.01	0.00	0.00

NOTES: - There are two (2) liquid level controllers for each dehydration unit separator and two (2) for each flash tank.
 Consumption rate is typical, taken from Cemco/Wellmark Mizer manufacturer spec sheet at 6.6 scf/day.
 - Hours of operation for pneumatic controllers estimated at 24 hours per day, 7 days per week.

Current Controller Emissions (Controlled)

Pneumatic Controller Emissions = (# of Controllers) * (Consumption Rate [scf/hr]) * (lb-mole/379.41 scf) * motive gas molecular weight (lb/lb-mole) * wt% VOC.

Component Description	Quantity	Manufacturer	Model	Consumption Rate (scfh)	Hours of Operation	VOC wt. fraction of instrument gas	HAP wt. fraction of instrument gas	VOC Emission (lb/hr)	VOC Emission (TPY)	HAP Emission (lb/hr)	HAP Emission (TPY)
Liquid Level Controller(s)	4	Cemco/Wellmark	Mizer (low-bleed)	0.275	8760	0.06	0.0025	0.00	0.01	0.00	0.00
								0.00	0.01	0.00	0.00

Company Name: **QEPM Gathering I, LLC**

Field Name: **Pinedale Field**

Facility Name: **Mesa 8-17**

Fugitives Emission Calculation (LDAR)

Equipment Leak Emission Estimates for Oil and Gas Production Operations

(Emission Factors Derived From Table 2-4, EPA-453/R-95-017, "Protocol for Equipment Leak emission Estimates", November 1995)

Component Type	Equipment Service Category			
	Gas	Heavy Oil ¹	Light Oil	Water/Light Oil ²
	(lbs/hr/component)	(<20 API Gravity) (lbs/hr/component)	(>20 API Gravity) (lbs/hr/component)	(lbs/hr/component)
Connectors	4.41E-04	1.65E-05	4.63E-04	2.43E-04
Flanges	8.60E-04	8.60E-07	2.43E-04	6.39E-06
Open-ended Lines	4.41E-03	3.09E-04	3.09E-03	5.51E-04
Pumps ³	5.29E-03	7.05E-05	2.87E-02	5.29E-05
Valves ⁴	9.92E-03	1.85E-05	5.51E-03	2.16E-04
Other ⁵	1.94E-02	7.05E-05	1.65E-02	3.09E-02

* - All factors are for total organic compound emission rates (includes non-VOC's such as methane and ethane).

1 - The emission factor for pumps was not derived in the actual protocol, the factor for "other" has been substituted for completeness.

2 - Water/Light Oil factors apply to water streams in oil service with a water content greater than 50% to less than 99%. For streams with water content greater than 99%, the emission rate is considered negligible.

3 - Pneumatic pump emissions are accounted for separately with the pneumatic pump and dehydration unit emission calculations.

4 - Includes Pressure relief valves.

5 - "Other" equipment types include, but are not limited to, hatches, site glasses, regulators and other instrumentation. dump arms, hatches, instruments, meters, polished rods and vents.

Facility Equipment Totals: *[(1) Dehy Separator, (1) Test Tank, (1) Dehy w/ Combustor]*

Component Type	Equipment Service Category			
	Gas	Heavy Oil	Light Oil	Water/Light Oil
		(<20 API Gravity)	(>20 API Gravity)	
Connectors	866	0	71	68
Flanges	36	0	4	2
Open-ended Lines	0	0	0	0
Pumps	0	0	0	0
Valves	142	0	25	23
Other	15	0	0	0

NOTE: The number of individual components are based on an actual site-specific equipment count performed for the Mesa 3-20 Pad facility. Components are determined based on the number of well heads, single separators, double separators, dehydration units (with combustors) and tanks there are on location.

Sample Calculation:

TOC (TPY) = component quantity * component factor * 8,760 hr/yr * 1 ton/2,000 lb.s

VOC (TPY) = TOC * VOC Fraction from gas analysis

Component Type	Equipment Service Category			
	Gas	Heavy Oil	Light Oil	Water/Light Oil
	(TPY of TOC)	(<20 API Gravity) (TPY of TOC)	(>20 API Gravity) (TPY of TOC)	(TPY of TOC)
Connectors	1.672462	0.000000	0.143975	0.072229
Flanges	0.135574	0.000000	0.004249	0.000056
Open-ended Lines	0.000000	0.000000	0.000000	0.000000
Pumps	0.000000	0.000000	0.000000	0.000000
Valves	6.170342	0.000000	0.603515	0.021765
Other	1.274625	0.000000	0.000000	0.000000
TOTAL	9.253002	0.000000	0.751739	0.094050
Weight VOC Fraction *	0.06	0.00	1.00	1.00
Weight HAP Fraction *	0.002	0.00	0.033	0.033
TPY VOC	0.58	0.00	0.75	0.09
lb/hr VOC	0.13	0.00	0.17	0.02
TPY HAP	0.02	0.00	0.02	0.00
lb/hr HAP	0.01	0.00	0.01	0.00

NOTE: * Mesa 8-17 Pad Wet Gas Analysis Wet Gas Analysis (06/12/14).

Source	VOC ¹		HAP ¹	
	(lb/hr)	(TPY)	(lb/hr)	(TPY)
Fugitives	0.33	1.43	0.01	0.05
Fugitives (LDAR)	insig.	insig.	insig.	insig.

NOTES: 1) - Due to implementation of an infrared (IR) LDAR program, both baseline and current fugitive emissions are being treated as insignificant (as approved by the WAQD).

Company Name: **QEPM Gathering I, LLC**
Field Name: **Pinedale Field**
Facility Name: **Mesa 8-17**

Wet Gas Analysis Calculation Sheet

Based on: **Mesa 8-17 Pad Wet Gas Analysis**

Component	Mole %	Mole Frac.	Lb/Lb mole	MW	VOC	HAP	LHV		HHV	
							BTU/scf	Btu/scf*Mole Frac	BTU/scf	Btu/scf*Mole Frac
Carbon Dioxide	0.4798	0.0048	44.01	0.21			0.0	0.00	0.0	0.00
Hydrogen Sulfide	0.0000	0.0000	34.08	0.00			586.8	0.00	637.1	0.00
Nitrogen	0.1206	0.0012	28.02	0.03			0.0	0.00	0.0	0.00
Methane	92.8579	0.9286	16.04	14.89			909.4	844.45	1010.0	937.86
Ethane	4.5262	0.0453	30.07	1.36			1618.7	73.27	1769.6	80.10
Propane	1.1036	0.0110	44.09	0.49	0.49		2314.9	25.55	2516.1	27.77
Isobutane	0.2888	0.0029	58.12	0.17	0.17		3000.4	8.67	3251.9	9.39
n-butane	0.2591	0.0026	58.12	0.15	0.15		3010.8	7.80	3262.3	8.45
Isopentane	0.1192	0.0012	72.15	0.09	0.09		3699.0	4.41	4000.9	4.77
n-pentane	0.0722	0.0007	72.15	0.05	0.05		3706.9	2.68	4008.9	2.89
Cyclopentane	0.0000	0.0000	70.08	0.00	0.00		3512.2	0.00	3763.4	0.00
n-hexane	0.0276	0.0003	86.18	0.02	0.02	0.02	4404.1	1.22	4750.2	1.31
Cyclohexane	0.0160	0.0002	84.18	0.01	0.01		4179.9	0.67	4481.2	0.72
Other Hexanes	0.0543	0.0005	86.18	0.05	0.05		4392.7	2.39	4744.5	2.58
Heptanes	0.0291	0.0003	100.21	0.03	0.03		5100.3	1.48	5500.4	1.60
Methylcyclohexane	0.0184	0.0002	98.19	0.02	0.02		4863.9	0.89	5215.7	0.96
2,2,4-Trimethylpentane	0.0022	0.0000	114.22	0.00	0.00	0.00	5779.1	0.13	6231.5	0.14
Benzene	0.0097	0.0001	78.11	0.01	0.01	0.01	3591.1	0.35	3741.5	0.36
Toluene	0.0093	0.0001	92.14	0.01	0.01	0.01	4273.7	0.40	4474.5	0.42
Ethylbenzene	0.0000	0.0000	106.17	0.00	0.00	0.00	4970.7	0.00	5221.7	0.00
Xylenes	0.0011	0.0000	106.17	0.00	0.00	0.00	4957.4	0.05	5208.4	0.06
C8+Heavies	0.0049	0.0000	315.00	0.02	0.02		5796.3	0.28	5794.1	0.28
Totals	100.0000	1.0000		17.6100	1.1096	0.0436		974.67		1079.66

Weight Fraction of Vapors that are VOC: **0.0630**

Weight Fraction of Non-Methane Vapors that are VOC: **0.4086**

Weight Fraction of Vapors that are HAP: **0.0025**

Gas Specific Gravity: **0.6079**

Lesair Environmental, Inc.
www.lesair.com

Company Name: QEPM Gathering I, LLC
 Field Name: Pinedale Field
 Facility Name: Mesa 8-17

Flare Gas Analysis Calculation Sheet

Based on: **Glycalc 4.0: Mesa 8-17 post condenser gas composition**
10 MMSCFD

Component	Mole %	Mole Frac.	Lb/Lb mole	MW	VOC	LHV BTU Content		HHV BTU Content	
						Btu/scf	Btu/scf*Mole Frac	Btu/scf	Btu/scf*Mole Frac
H2O	6.88	0.0688				0.0	0.00	637.1	43.83
Oxygen	0.00	0.0000	32.00	0.00		0.0	0.00	0.0	0.00
CO2	7.13	0.0713	44.01	3.14		0.0	0.00	0.0	0.00
N2	0.06	0.0006	28.02	0.02		0.0	0.00	0.0	0.00
Methane	45.40	0.4540	16.04	7.28		909.4	412.87	1010.0	458.54
Ethane	10.70	0.1070	30.07	3.22		1618.7	173.20	1769.6	189.35
Propane	6.62	0.0662	44.09	2.92	2.92	2314.9	153.25	2516.1	166.57
I-Butane	2.95	0.0295	58.12	1.71	1.71	3000.4	88.51	3251.9	95.93
N-Butane	3.68	0.0368	58.12	2.14	2.14	3010.8	110.80	3262.3	120.05
I-Pentane	1.51	0.0151	72.15	1.09	1.09	3699.0	55.85	4000.9	60.41
N-Pentane	1.35	0.0135	72.15	0.97	0.97	3706.9	50.04	4008.9	54.12
Hexane+	13.72	0.1372	125.74	17.25	17.25	4403.8	604.29	4755.9	652.61
Totals	100.00	1.0000		39.7436	26.0898		1648.82		1841.41

Fraction of Vapors that are VOC: 0.6565
 Fraction of Non-Methane Vapors that are VOC: 0.8037
 Fraction of Vapors that are H2S: 0.0000
 Gas Specific Gravity: 1.3719

Based on: **Glycalc 4.0: Mesa 8-17 flash tank off gas composition**
10 MMSCFD

Component	Mole %	Mole Frac.	Lb/Lb mole	MW	VOC	LHV BTU Content		HHV BTU Content	
						Btu/scf	Btu/scf*Mole Frac	Btu/scf	Btu/scf*Mole Frac
H2O	0.03	0.0003				0.0	0.00	637.1	0.22
Oxygen	0.00	0.0000	32.00	0.00		0.0	0.00	0.0	0.00
CO2	0.88	0.0088	44.01	0.39		0.0	0.00	0.0	0.00
N2	0.12	0.0012	28.02	0.03		0.0	0.00	0.0	0.00
Methane	90.70	0.9070	16.04	14.55		909.4	824.83	1010.0	916.07
Ethane	5.35	0.0535	30.07	1.61		1618.7	86.60	1769.6	94.67
Propane	1.48	0.0148	44.09	0.65	0.65	2314.9	34.26	2516.1	37.24
I-Butane	0.43	0.0043	58.12	0.25	0.25	3000.4	12.78	3251.9	13.85
N-Butane	0.41	0.0041	58.12	0.24	0.24	3010.8	12.37	3262.3	13.41
I-Pentane	0.19	0.0019	72.15	0.13	0.13	3699.0	6.92	4000.9	7.48
N-Pentane	0.12	0.0012	72.15	0.09	0.09	3706.9	4.49	4008.9	4.85
Hexane+	0.29	0.0029	125.74	0.37	0.37	4403.8	12.95	4755.9	13.98
Totals	100.00	1.0000		18.3077	1.7309		995.19		1101.77

Fraction of Vapors that are VOC: 0.0945
 Fraction of Non-Methane Vapors that are VOC: 0.4604
 Fraction of Vapors that are H2S: 0.0000
 Gas Specific Gravity: 0.6320

Company Name: QEPM Gathering I, LLC
Facility Name: Mesa 8-17

Attachment C

Emissions Comparison and Offset Tracking Sheet

Prepared for:
QEPM Gathering I, LLC

Prepared by:
Lesair Environmental, Inc.
www.Lesair.com

Company Name: QEPM Gathering I, LLC
Facility Name: Mesa 8-17

Emissions Comparison (TPY)

Current Actual Emissions:	Mesa 8-17	VOC	0.2	NOx	0.3
Historical Actual Emissions *:	Mesa 8-17	VOC	7.3	NOx	4.7
Historical vs. Actual Difference		VOC	-7.1	NOx	-4.4
Offset (1.5:1 for VOC, 1.1:1 for Nox)		VOC	7.1 Credit	NOx	4.4 Credit

Note:

SUBLETTE COUNTY PERMITTED EMISSIONS April 1, 2008 - PRESENT

company	field	facility	date of permit application	date of receipt (permit)	permit/waiver / AP #	Equipment Design / Current Actual Emissions (TPV)			Baseline Emissions (TPV)			Increase/decrease from baseline emissions (TPV)			VOC Offset Bank	NOx Offset Bank	Reason for Change
						VOC	NO _x		VOC	NO _x		VOC	NO _x				
QEPM	Dry Piny	Dry Piny Compressor Station	6/17/2013	10/7/2013	MD-15150	3.3	2.3		24.3	100.3		-21.0	-98.0		-21.0	-98.0	Replacement of uncontrolled IR 12-SYGA 660 hp engine with Waukesha 124GSI 483 hp engine with AFRC and NSCR
QEPM	Pinedale	Pinedale Complex	2/8/2008	7/1/2008	MD-7113	117.9	136.8		126.8	139.5		-10.5	-0.7		-10.5	-0.7	Installation of turbine
QEPM	Pinedale	Pinedale Complex	3/1/2010	7/1/2010	MD-8082	108.3	139.2		118.0	139.5		-4.7	0.0		-4.7	0.0	Routing condensate to sales line instead of truck loadout
QEPM	Pinedale	Pinedale Complex - Gobblers Knob	11/1/2010	3/2/2011	MD-11378	137.0	136.5		114.1	139.5		22.9	0.0		34.4	0.0	Increase VOC emission limit for four engines
QEPM	Pinedale	Pinedale Complex - Scab Plant	6/30/2010	10/22/2010	MD-10895	1.1	0.0		0.0	0.0		1.1	0.3		1.7	0.3	Route all condensate through ST-3.
QEPM	Pinedale	Mesa 6-16 Pad				1.6	2.6		1.6	2.6		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 5-8 Pad	12/1/2014			1.5	2.4		1.5	2.4		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 9-8 Pad	12/1/2014			3.2	2.8		3.2	2.8		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 12-8 Pad	12/1/2014			0.5	0.7		0.5	0.7		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 12-16 Pad	12/1/2014			1.0	1.6		1.0	1.6		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 13-16 Pad	12/1/2014			0.5	0.9		0.5	0.9		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Pinedale Unit 8 Well	12/1/2014			6.6	0.1		6.6	0.1		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 3-21 Pad	12/1/2014			0.4	0.6		0.4	0.6		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 15-9 Pad	12/1/2014			1.3	1.6		1.3	1.6		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 9-16 Pad	12/1/2014			1.8	2.7		1.8	2.7		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 8-17 Pad	12/1/2014			7.3	4.7		7.3	4.7		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 11-7 Pad	12/1/2014			1.7	2.5		1.7	2.5		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 15-16 Pad	12/1/2014			2.4	1.6		2.4	1.6		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Stewart Point 2-20 Pad	12/1/2014			3.6	2.7		3.6	2.7		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 14-16 Pad	12/1/2014			1.8	0.4		1.8	0.4		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 15-6 Pad	12/1/2014			2.1	0.7		2.1	0.7		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 10-16 Pad	12/1/2014			2.3	1.7		2.3	1.7		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Stewart Point 1-30 Pad	12/1/2014			1.7	0.5		1.7	0.5		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 6-7 Pad	12/1/2014			3.4	2.9		3.4	2.9		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa Unit 13-05V Well	12/1/2014			10.8	0.1		10.8	0.1		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 1 Pad	12/1/2014			2.0	0.5		2.0	0.5		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 7-7 Pad	12/1/2014			4.8	2.9		4.8	2.9		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 3-7 Pad	12/1/2014			9.1	0.1		9.1	0.1		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa Unit 4-8 Well	12/1/2014			4.1	2.0		4.1	2.0		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Stewart Point 14-20 Pad	12/1/2014			5.7	2.8		5.7	2.8		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Stewart Point 7-20 Pad	12/1/2014			6.4	2.7		6.4	2.7		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Stewart Point 2-20 Pad	12/1/2014			2.7	1.6		2.7	1.6		0	0.0		0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPF permit split
QEPM	Pinedale	Mesa 11-16 Pad	12/1/2014			0.2	0.3		0.3	0.3		-7.1	-4.4		-7.1	-4.4	Establish QEPM baseline and current emissions resulting from Mesa 8-17 Debit Swap with Mesa 13-5
QEPM	Pinedale	Mesa 8-17 Pad	7/7/2015						7.3	4.7		-7.1	-4.4				Establish QEPM baseline and current emissions resulting from Mesa 8-17 Debit Swap with Mesa 13-5
		QEPM TOTAL				458.1	466.8		477.4	569.6		-19.3	-102.8		-7.3	-102.8	